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### Bear Smart UM: Creating a University Campus Safe for Bears and Students

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**Bear Smart UM:**

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University of Montana

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## **I. Abstract**

Universities nestled in the mountains across the globe like the University of Montana may find themselves dealing with human-bear conflict while lacking the proper resources to approach management. At UM, there has been an increase in bear activity over the past five years and it is expected to increase. Developing a plan to prevent bear activity on campus can be costly, time-consuming, and tedious. Our student group's solution includes two intertwining parts: A bear management plan and educational outreach surrounding bear safety. The recommendations in the bear management plan were created by consulting bear-conflict specialists from Missoula County, craftspeople who construct bear-proof enclosures, and hotspots for bear activity gathered by the UM Chapter of the Wildlife Society. The bear management plan includes recommendations related to waste management for different locations on campus, fruit trees and native plants that are bear attractants, and a corresponding budget. The educational outreach has involved creating informational PowerPoints and flyers and presenting them to classes at UM to educate students about bear-safe behavior and to encourage students to attend our bear spray safety demonstration by the Bear Aware Campaign on April 4, 2023. Both parts of our project are essential in providing useful solutions for UM as we move into yet another bear season and seek to reduce bear-human conflict.

## **Introduction**

Since it was founded in 1895, the University of Montana (UM) has been known for being surrounded by wild green spaces, and even today, promotes proudly in marketing material that the campus is “nestled in the heart of Western Montana’s stunning natural landscape” (“About UM” 2022). Of course, with this proximity to conservation lands and open spaces, it is inevitable

that campus also experiences human-wildlife conflicts. Many universities in the United States must manage human-wildlife interactions with deer, squirrels, or birds. The University of Montana has been dealing with something unique: bears.

As of 2022, the University of Montana is at the forefront of colleges in the U.S. that deal with bear activity on their campuses. Adjacent to Mount Sentinel and city open lands, the UM campus naturally draws in bears from the hills above. In the past few years, the university has consistently had many sightings of black bears on its campus. These sightings are in the same places frequented by students and employees, right on central campus. Enticed by garbage cans and unkempt fruit trees, these bears have made it past the university and into the housing district beyond.

On October 4, 2022, the Missoula City Council officially voted to make Missoula a Bear Smart community, a standard coined by the Bear Smart program that comes from Victoria, British Columbia. The Bear Smart Program measures how fit a community is when it comes to managing human-bear cohabitation. Presented by Missoula's Bear Smart working group to the City Council, the plan outlines a buffer zone around Missoula to install bear-safe garbage cans as opposed to the typical open-topped cans, as well as remove fruit trees, outdoor pet food, and other bear attractants. The University of Montana is included in the proposed bear buffer zone. That proposal also estimated that there are over 200 black bears in Missoula. That is 200 black bears that could be tempted to peruse city streets and neighborhoods in search of food. Because of waste management deficits, this could put both humans and those bears in danger.

By examining past bear management in the United States and beyond, as well as current practices in Missoula, we propose an official bear management plan for the University of Montana to make it the country's first Bear Smart campus. The university is a leader in our

community; proactively establishing our own internal working group and drafting a Bear Smart Plan would signal to others in Missoula that this is an issue that must be taken seriously and that UM is willing to do our part. If the campus fails to implement bear safe practices, it will set a poor standard for the rest of Missoula in following the Bear Smart guidelines to protect both humans and bears from further conflict.

## **II. Literature Review**

### **Issue Context**

Human-wildlife interactions are increasing due to development, particularly when it concerns black bears (*Ursus americanus*) encroaching onto urban spaces looking for food (Lewis 2015). With increased interactions between humans and bears, comes increases in conflict: “These conflicts [are] caused by competition between bears and humans for food and space. In most cases, the bears [are] present in these places before humans arrived” (“Bear Hazard Assessment” 2022) The following literature provides a backdrop to past and present understandings of increased bear-human conflicts, management strategies within various entities, and where increased understandings of the subject need to be addressed. We use Missoula, MT, as an area of focus for bear activity and management because of the ongoing issue each summer and fall with bear activity on campus and the need for proactive management. We believe that the University of Montana Missoula may be the first American university to develop a campus-specific bear management plan, so there is potential for UM to serve as a leader and model for campuses dealing with similar challenges.

## **International Examples**

While we focus on Missoula and the University of Montana experiencing a rise in human-bear conflicts, it is important to this research to recognize that there are many places throughout the world where people come into close contact with bears and in addition have found information on how to best manage bears situationally. In Romania (Camelia 2021) and Greece (Karamanlidis 2011), long-term preventative solutions targeted at brown bears in the form of better management of agriculture and human activities are more beneficial than solving case-to-case issues. In Ontario, where conflicts with black bears are common, one study demonstrated that increasing the number of bears that hunters are allowed to harvest every year has little effect on the amount of conflicts with humans (Obbard 2014). Even in India, where the more exotic sloth bears pose issues, they similarly discovered that raising awareness and better defending crops helps diminish human-bear conflicts (Debata 2017). While all of these studies help point out the threat of human-bear conflicts relating to specific human behaviors, none of them lay out a plan for universities to follow specifically. They *do*, however, reflect the importance of proactive management of bear food rather than reactionary management strategies. The goal of this project is to establish a plan a university can follow to mitigate bear conflicts, but looking at a global context of conflict, this management plan can benefit other universities dealing with similar issues around the world.

## **National Parks as Early Management Models**

Wildlife in the United States have suffered for centuries under aggressive management. Historically, white settlers viewed carnivores as dangerous and evil, a rationale that contributed to wolves and bears being hunted to near extinction (Kellert 1996). Unsurprisingly, the most



evident early bear managers were those working for the National Park Services. These integral players held the view that national parks should offer wildlife views by any means necessary. In the early 1900s, there was a huge push for people to be able to view black bears in Yellowstone National Park, and the solution was for rangers to intentionally draw black bears into viewing sites for tourists (“Bear Management” 2020). They would lay out feed and garbage for the bears, and the bears would appear in droves. The Yellowstone Game Warden in 1902, C.J. “Buffalo” Jones, would snare bears on these garbage heaps and “give them a sharp chastisement” while they hung by their legs. He thought this would discipline the bears into avoiding humans (French 2016). As more bears got used to the human feeding sites and more people came to view them, there was a high rate of injury and property damage (“Bear Management” 2020). In response, rangers removed the viewing sites, but allowed the garbage feeding pits to stay open for black bears to visit (“Bear Management” 2020).

Glacier National Park had similar management practices for bears. From 1960-1969, the park superintendent said, “When a grizzly bear appears in any area of human use, it will be immediately destroyed by a park ranger” (Gniadek 1995). The park also allowed trash to be out in the open until two tourists were killed in 1967. After the park implemented bear safe trash management, the bear-human conflicts declined drastically (Gniadek 1995). The Craighead brothers were the first people to really introduce better bear management practices. After the removal of the trash sites in Yellowstone National Park, the brothers implemented a new grizzly bear management program (Brasington 2019). It bolstered the park’s new protocol for dealing with bears, and allowed them to move forward to reduce human-bear conflicts with both parties’ best interests at heart. What can be learned from our national park’s history is that bear management comes down to people management, and if people cannot manage how they are

influencing bear populations, bears suffer the consequences. There needs to be more research on how we can teach people to live with bears, and what forms of education can be most beneficial to the entirety of the population.

Modern management of bears is primarily focused within our National Parks, and these styles of management are helpful in designing a University management plan. The National Park Service itself has a section of their website dedicated to staying safe around bears. It shares important information regarding what one should do if they see a bear, how to avoid an encounter, what to do if attacked, and how to use bear spray. Glacier National Park has an ongoing research project addressing human-bear conflicts. Biologists and managers at Glacier have been monitoring bear behavior and sightings around the park to make the most informed decisions for what needs to be done. The biggest factor they discovered is improper food storage (National Park Service 2020). In order to combat this, Glacier has made education on proper bear etiquette a big priority. They do so through their website, social media, printed materials, and personal orientations to teach park staff, all tactics easily adaptable by a university (National Park Service 2020). Another park that has to deal with bears is Yellowstone. Like Glacier, Yellowstone also keeps track of bear sightings for their Bear Project Annual Report. To prevent conflicts, the park utilizes bear warning signs, area closures, and large carcass removals as some of their techniques to prevent interactions (Yellowstone Center for Resources 2019). The park also conducts research on bears and uses the results as a form of education. A bear thermoregulation study led to the publication of a children's book that is sold in bookstores throughout the park (Yellowstone Center for Resources 2019).

Denali's bear management plan uses a variety of different methods to educate park visitors about bears. These range from brochures, bulletin signs, interpretive training, and

mandatory bear safety videos for those getting a backcountry permit (Denali National Park and Preserve 2003). They also have bear proof food lockers at all campgrounds and require all backcountry hikers to have bear resistant food containers or BRFCs (Denali National Park and Preserve 2003). Bear awareness tends to be in the front of mind for staff and visitors while camping and hiking in a National Park, the same mindsets are not applied to urban settings. Being able to effectively implement the same awareness to students and faculty in settings such as The University of Montana is the main goal of this project, and will have to be done thoughtfully and intentionally.

### **Indigenous Perspectives and Bear Management**

It is important to note that bear management and human-wildlife interactions in the United States date back prior to European settlement in the area. Many Indigenous peoples of North America have held the belief that grizzly bears are equal to humans and must be treated with a deep respect. An example of Indigenous bear management can be seen on the Flathead reservation, home to the Salish, upper Pend d'Oreille, and Kootenai tribes. According to James Claar's paper, deaths of grizzly bears in the Flathead Valley, besides hunting-related deaths, were analyzed and tracked from 1972 to 1982. This paper highlights the fact that bears are deemed "nuisance" when they are living where they always have. Conflicts therefore arise from a human-made environment that is not bear friendly. In response, on the Reservation, grizzly hunting was closed in 1981 for Salish and Kootenai cultural concerns about the populations (Claar 1986). Bears hold a cultural significance to many tribes, and this is evident in how the reservation approaches bear management from the perspective that humans are the issue and not always the bear. The aboriginal people of the Yukon region in Northern Canada express that a

bear should not be bothered or have their life taken unless they are a true danger to the community (Clark 2009). Many tribes in the United States feel that they should have greater involvement in local bear management plans, because of the experience they have with bears and the sacredness that bears hold within their culture. Specifically, prominent members of the Eastern Shoshone, Hopi, Northern Arapaho, Blackfeet, and Salish and Kootenai tribes have asked to be involved in the process of delisting grizzly bears from the endangered species list and bear management plans near their reservations (French 2022). This information suggests Indigenous peoples have interacted with bears far more than any wildlife organization thus making more room for Indigenous people in the entirety of the U.S. and specifically the UM community to provide guidance on how to interact with the increasing bear population in the community would prove to be greatly beneficial.

### **Local Context: Missoula, MT**

Currently, we are seeing an increased number of bears in the Missoula Valley. These bears are becoming habituated, and therefore are increasingly deemed as problem bears. There is a direct correlation between how food conditioned a bear becomes, habituation level that a bear reaches, and the creation of a conflict bear (Marley 2016). As of October 2022, there are 150 to 200 black bears within the Missoula Valley, and upwards of 80 within Missoula County (The Missoula 2022). In Missoula's case, bears have been depreciating livestock, entering homes, and causing structural damage. Montana Fish, Wildlife, and Parks has had to capture several black bears, and euthanize 2 in 2022 due to being habituated. Another concern is bear mortality from highways and roads. This puts drivers in danger and leaves cubs without mothers (The Missoula 2022). In addition, the University of Montana has sent out nine bear alert warnings since the start

of autumn semester, 2022. In order to properly address these issues, both the city of Missoula and UM must take precautionary measures to avoid creating conflict bears for the future.

As cities like Missoula, are quickly growing and expanding, urban-wildlife conflicts will only become more frequent. In order to make decisions that impact future and current city planning, it's important to understand people's attitudes towards bears. In 2004 and 2008, randomly selected Missoula residents received questionnaires to gain a better understanding of citizen attitudes toward bears. The questions measured attitudes toward black bears and "preferences for management actions." Seventy-four percent of the randomly selected residents in 2004 responded and 60.1% of the residents responded in 2008 (Merkle 2011). One notable finding; the prevalence of outdoor garbage storage had decreased and the support for actions towards human-bear interactions increased. This research allows us to understand where attitudes on black bears are on average in a city surrounded by black bear habitat, but it does not show data for the University of Montana campus specifically. Since the University of Montana backs up to Mount Sentinel, one of the main wildlife corridors bears use to access Missoula, and the city of Missoula is in close proximity to other mountains, this information would be greatly beneficial. We could use this study as a guideline to conduct our own research to gain a better understanding of where Missoula residents' attitudes stand. Replicating the study but focusing entirely on UM would help determine the ability our project has to influence others to become bear-smart.

### **Management Resources: Missoula and Beyond**

While human-bear exchanges are increasing, so are resources within Missoula to address bear conflict management. The Mountain and Prairie podcast interviewed a Montana rancher,

Bryce Andrews who wrote “Down from the Mountain; The Life and Death of a Grizzly Bear.” Andrews is a rancher who modifies his practices to protect big predators, especially bears. These practices include fencing strategies and deterrents such as alarms and dogs (Andrews 2022). One group in Missoula helping to educate Montanans on bear safety is the Be Bear Aware Group. They provide educational programs with their trailer including bear spray demonstrations (Be Bear 2022). Another group of Montanans working to educate humans on living in bear country, and to protect bears is The Natural Resources Dept. of the Confederated Salish and Kootenai Tribes. The Department puts on an annual festival called the “Bears and Birds Fest,” which celebrates birds, bears, and the rest of the natural world while teaching how to co-exist with them peacefully (“Birds & Bears Fest” 2015). The two most important pieces of local literature when it comes to this project are the “Bear Hazard Assessment” and “Final Conflict Management Plan” for the city of Missoula. The assessment outlines a buffer zone where human-bear conflict is much more likely to happen. They then go over some of the most common reasons for human-bear conflict, and for bears who become food habituated, including unsecured garbage, compost, pet food, and more. The conflict management plan outlines the steps to take for Missoula to become bear-smart. It goes over the ordinances and rule changes that would be needed, as well as responses to those who may not feel the effort is worth it. Examples of steps that should be taken include removal of fruit trees, electric fencing around attractants, and bear proof trash cans (The Missoula Bear Smart Working Group 2022).

A common theme for bear-human conflict management is education. In order for any bear management work as mentioned above to be effective, proper education techniques must be utilized. Human behavior is complex and changing it can prove to be a difficult task. Sheila Reddy published a study on effective ways to influence behavior. To encourage bear aware

behaviors, it is important to promote awareness and concern, incentivize behavior, and nudge behavior (Reddy 2016). Incentives to do so can be extrinsic or intrinsic. Examples of extrinsic incentives are financial and social values and examples of intrinsic incentives are things such as self-image, and personal values (Reddy 2016). Understanding what is important to a person will help one to understand the best ways to inform them in a way that will make them want to change.

One education tool recommended is communication. Being persuasive in communication is important to change behavior (Miller 2018). An important method of implementing persuasion is the central route. The central route motivates people to listen to a message (Miller 2018). Motivation can come from relevance to people's values. When educating people it is important to start with lower-level cognitions such as value orientations that influence higher level cognitions such as attitudes and behaviors (Miller 2018). People are not going to be motivated to change if they do not value or relate to what is being said. To educate effectively it is important to relate your topic of interest to the target audience. To relate this to our situation, William Dunn, conducted a study that explores best ways to educate people on safety in bear country. The researchers explored the effectiveness of distributed brochures, posters, and cohesive signs about bear safety. They discovered that in areas with signage respondents had higher knowledge levels on bear safety than those in areas without signage (43). Dunn goes on to discuss how education programs need to be focused and concise, easy to read, and attention catching to be most successful (50). To make safety information most noticeable it is important to provide material in areas where and when people are most likely to encounter bears (Dunn 2008). This information will be useful in order for bear education to reach the wide audience of university staff, faculty, students, and visitors who inhabit campus everyday.

Jamie Jonkel, longtime bear biologist with Montana Fish Wildlife and Parks, wrote a guide in 1993 about handling bears. In it, he stated, “Habituated behavior demonstrated by bears is usually an indication of poor people management. Problem bears are not born, they’re made” (Jonkel 1993). The main issue that the University of Montana Grizzly campus should be focusing on is how to better manage the humans that live, work, and study on its campus in order to reduce the number of bears coming into the area. If we can educate people on how to dispose of trash correctly, be bear aware, and also install bear proof garbage containers on campus, then it will drastically reduce the number of problem bears that the university creates (French 2016). If we can research how to manage and teach students and faculty to be bear safe, then we can work towards eventually keeping all black bears safe from being habituated to campus garbage. The literature available is comprehensive and encouraging. The local Management Plan created by Bear Safe Missoula was recently adopted by the Missoula city council, and there is a long history, especially in Missoula, of efforts made to live peacefully with bears. Additionally, the Hazard Assessment cited work already done by the University of Montana Student Wildlife Society to prepare a bear hazard assessment and management plan for the University, which we wish to elaborate on and fully implement into the university. The work of this capstone project seeks only to further the efforts of the above groups by influencing the University of Montana to become a part of these efforts. The University should and will be a good example to the rest of the city as the whole Missoula area becomes more bear safe. While the campus will face some unique challenges, there are many allies within the university. The group will draw from this literature review and other available resources to make the school a leader in this progressing community, not a bystander.



### **III. Methods**

We believe that the University of Montana is a critical partner in Missoula's efforts to become a Bear Smart community and aimed to use our capstone project to align UM with community Bear Smart goals. To accomplish this, we conducted work in two categories: First, we spent the spring 2023 semester educating UM affiliates (students and employees) on bears, bear behavior, and what it means to be "bear smart". The second scope of our work included researching bear smart strategies and developing and proposing a bear management plan that UM can implement over this summer and following years. We have outlined the steps and justifications for each of those categories below.

#### **Educating the UM Community**

The first goal of our project was to promote awareness and education of bear behavior and bear safety on the University of Montana campus. To accomplish this goal, we targeted students, faculty, administrators, staff, and facilities professionals. For students, we focused on marketing strategies to spread awareness. By utilizing visual media such as powerpoint we aimed to inform the student body of proper bear safety techniques during classroom presentations. Student engagement with these educational presentations was higher than expected. Visual media is proven an effective educational tool. According to a study conducted by William Dunn, areas with signage about bears had respondents with higher knowledge levels of bear safety than those in areas without signage (Dunn 2008). With this knowledge, one of our recommendations for our bear management plan is to implement signage near the Kim Williams Trail and around campus housing. We also put together educational activities and literature to engage students with during campus events.

As soon as the spring 2023 semester began in January, we contacted professors to speak in lectures about bear safety in order to reach many different disciplines of study, specifically outside of forestry and conservation. We identified large seminar-style classes and reached out to the professors of those courses with a request to give a short presentation at the beginning of their lecture. The presentation included directions to resources within Missoula, as well as an in-person slideshow to go along with a short speech about bear safety and what being Bear Smart means.

We discussed our bear management plan in depth with wildlife faculty as well as with non-wildlife faculty to gain their support for the plan and to answer any questions or concerns about workplace changes. We also worked with the Associated Students of the University of Montana (ASUM), UM's student government organization, on designing a resolution which when passed in the senate will signal student support for our bear management plan. Our desired results are for students to feel confident about how to behave in bear country and for them to gain a general sense of respect and appreciation for wildlife. We are all Grizzlies, and we should strive to protect bears.

The third group of people we educated and engaged in our project were administrators. We recognize the importance of administrative support for making campus a Bear Smart community not only to encourage staff and facilities to implement our plan but also to oversee the costs and processes of realistic implementation. UM staff and facilities are the last and perhaps most critical stakeholders in our project, as they are the people that can actually implement meaningful changes to make campus Bear Smart. We shared information on what a Bear Smart community is, why UM should become one, and the process required to do so with

Paula Short and Paul Trumbley during a small presentation put together by the entire capstone group in April 2023.

### **Develop and Share a UM Bear Management Plan**

While our first scope of work established our goal among the campus community, our second goal synthesized that information into an actionable plan, which allowed this group to approach those who can make the campus Bear Smart at a more practical level. First, we drafted a set of recommendations for the facilities staff and administration. In order to do this, we pulled relevant strategies from the existing Missoula Bear Smart Plan that apply to UM. We also communicated with Chad Bishop of the Franke School of Forestry regarding a bear safety plan he drafted with a student group in recent years. A full draft of the report was completed by March 10th, and sent to Jamie Jonkel from FWS and Erin Edge from Defenders of Wildlife for review. Once reviewed and edited we presented our management plan to facilities on March 15th. Speaking face-to-face with facilities brought in the human dimension of habituated bears, allowing the group to answer any questions facilities had about our role in ensuring the safety of bears and humans alike. This report outlines actionable steps and serves as a roadmap for the future. The last objective of the Bear Smart group was for an ASUM resolution to be put forward in support of the report. A resolution in support further informs the student body and all levels of administration.

### **Limitations**

This plan relies heavily on implementation from facilities and staff, and acceptance from the campus community, two factors we value wholeheartedly. Limitations include but are not limited

to the following. First, though facilities and services is fully on board with the plan, they do ultimately have the final say as to whether or not any changes are implemented when it comes to the general running of the University. Another limitation is the lack of ability to control public opinion when it comes to bears. Bears, like most large predators, are not universally loved or understood, and many community members may not agree that peaceful coexistence is the answer to the bear problem on campus. Finally, forces outside our control compel bears to move closer and closer to spaces with humans like climate change and food attractants, which can be reduced but not necessarily eliminated. While a "Bear Smart " campus would undoubtedly be a good thing, it is not the end all be all solution to the crisis of habitat and food loss facing Montana bears. These are all factors we are aware of moving forward.

#### **IV. Findings and Analysis**

The main result from this project, considering it was not a quantitative endeavor was the creation of a workable living Bear Management Plan. This document is incredibly feasible for use at the University of Montana specifically, but also as a template for other wildlife facing University Campuses. As time goes by, the question of whether this plan will be fully implemented is the main hurdle this group recognized during the final phases of this capstone. Our conclusion is that proper implementation relies on funding, and teamwork from a multitude of disciplines. This being said, funding is also a large challenge posed to this capstone project. We found through multiple discussions with people working on campus and in the community that the solution that should be implemented will require a lot of thought, and we need to consider how to make this project live and thrive past our graduation from UM. We hope that the steps this capstone group has taken this last year will pave the way for campus administration to

finalize as many plausible recommendations in this plan as possible, and to take advantage of a broader bear management plan as needed.

Through campus events, and discussions with campus administration, it is clear that there is an overarching desire to become more bear safe at the University of Montana, information that this capstone group was pleasantly surprised to learn in our second semester of implementation. Creating awareness was the largest task other than drafting the Plan itself. There is a lack of awareness on this campus regarding human-wildlife interactions and much of our work went into educating students this semester, including establishing ways for education to continue once we are gone. Future Grizzlies will likely experience bi-annual bear safe training from Be Bear Aware, which will include bear spray demonstrations, and best practices in the backcountry and front country alike. Future Grizzlies will also be required to finish a short bear safe online module with new student orientation as well which will outline where to put garbage on campus, how to react when in the presence of a bear, and where to go for more information.

## **V. Conclusion**

The University of Montana places a large emphasis on the value of wildlife in the community and creating an environment that reduces human-bear conflict reflects that value. In the past, the University has served a role in helping bears become habituated to human spaces through easy access to garbage. Our management plan provides guidelines to change that relationship and to help UM lead our community in responsible Bear Smart strategies. This management plan also serves as a strong frame of reference for other college campuses or communities dealing with large animal interactions. Not only is a management plan needed to create a bear smart campus, but effective education on bear safety is also necessary. Our capstone

group has planted the seed for bear safety education access for students through tabling on campus as a partner of the Bear Aware Campaign. Overall, a multitude of steps were taken to fulfill our goal of becoming closer to being a campus safe for its human and bear residents.

## **VI. Reflections**

**Prompt #1: In what ways do you feel your project represents a multi disciplinary effort? What were the challenges and benefits of working across disciplines?**

This bear aware project is multidisciplinary due to its nature. Approaching human-wildlife interactions, especially within the urban interface requires a fundamental understanding of biology and sociology, while also taking into consideration the economic and ecological impacts of any potential action. Without the knowledge base of the wildlife biology experts in the Missoula area, facility service operators, funding and budgeting processes, and effective methods of education for a campus community, a bear management plan simply could not exist. While we as a group synthesized information, we owe the majority of this project to a handful of well-informed individuals and entities supplying us with vast arrays of knowledge. With this kind of resource building comes relationship building, which is seen as a large benefit to arise from this capstone. Student opinions are valued at the University of Montana, and the opportunity for this capstone to jumpstart much needed conversations regarding bear activity on campus allowed an environment where the conversation will hopefully continue after we are gone. With great opportunity comes difficulty and this kind of information gathering requires complex and sometimes difficult paths of communication which was the biggest challenge in this multidisciplinary effort. From this, persistence, preparation, and patience are skills we all learned from this effort.

**Prompt #2: Explain the challenges your group faced in designing and carrying out The substance of the project. For example: How did you attempt to address these challenges? How did the project change after the proposal stage? How might you do things differently?**

At the beginning of our capstone process, our group planned a substantial number of goals intended to create a campus that is hopefully more so now, and will be in the coming generations, aware and more cautious of their actions in regards to the safety of our community and campus. Though we accomplished many of these goals, there were some that we did not reach. There was a lot of debate on creating a website, or using a QR code to link to the website, that would further educate on bears. We originally had this as a goal, but decided as a team that students would be less likely to go out of their way to scan a QR code hanging around campus. So we put our focus on in person conversations and direct interaction with students across campus. Studies have shown that creating a campus where the “social norm” is being bear aware leads to a larger number of students that will comply with the recommendations. We also planned to send out a mass email to the faculty and potentially students, but didn’t prioritize it. Instead, we went to the larger classes that would let us present a PowerPoint on our project and why it matters. A small challenge at first was working with different groups across campus and in the community. What seemed overwhelming when discussing all the people we wanted to speak to and work with, ended up working out because our team was able to easily communicate and take equal responsibility reaching out to people so it wasn’t just up to one team member. Even when people didn’t respond for weeks at a time, we kept up with who was in contact with who at each meeting. Our group wouldn’t change the outcome of our project as it was successful to us and those we’ve gotten feedback from, although we wish we had time to do so much more!

**Prompt #3: Read the global context section above. How did considering the global context of the problem your group identified influence your thinking, the project, and the complexity of your work? What challenges did you encounter and how did you resolve them? What would you do differently if you were to repeat this process?**

Considering the global context of our problem influenced the group by encouraging us to look outward. Missoula's plan is modeled after the original in British Columbia, Canada, and our plan took after the Missoula plan meaning most of the lessons from the original are being incorporated. Canada is known for being willing to invest money in social problems such as human-wildlife conflict. It is an amazing example for a state with such an abundance of natural spaces and wildlife. The challenge of our group was the lack of other global context available. Few cities have taken on the Bear Smart initiative, and many other countries don't deal with the unique circumstances of living in bear country. So, admittedly, our global context is not wide. However, our hope is that our plan will be referenced by other Universities around the world dealing with similar problems. It is paramount that our impact is a substantial reduction of harmful human wildlife interactions. If we were to repeat this process, we would have reached out to administrators of the Bear Smart initiative in British Columbia to understand how they came to understand the problem, and gain enough public support to address it.



## **APPENDIX: MANAGEMENT PLAN**

Bear Smart UM: Bear Smart UM: A Proposal to Address and Avoid Bear - Human Conflict at  
the University of Montana

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Advisor: Eva Rocke

## **PREFACE**

The UM Bear Management Plan was written by members of a Global Leadership Initiative capstone group based on work done by the Missoula Bear Smart Working Group, as well as the Montana Student Chapter of the Wildlife Society. The intention of this plan is to provide necessary resources to the University of Montana (UM) in order to take an active stand within the Missoula community in enforcing the Missoula Human-Bear Conflict Management Plan, which was adopted by Missoula City Council. Given that UM falls in the so-called “bear buffer zone,” the authors believe that the university is obligated to reexamine various methods of dealing with bear attractants as outlined here, making campus a safer place for both students and bears. The grizzly bear is the mascot of UM; we should be doing our part in creating a bear-safe community.

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## **INTRODUCTION:**

The University of Montana has been known as one of the campuses in the U.S. lucky enough to be surrounded by public land and to have abundant green/natural spaces intermixed with buildings and infrastructure. We proudly promote in marketing material that campus is “nestled in the heart of Western Montana’s stunning natural landscape” (“About UM” 2022). Of course, with this proximity to conservation lands and open spaces, it is inevitable that UM also experiences human-wildlife interactions. Many universities in the United States must manage human-wildlife interactions with deer, squirrels, or birds. The University of Montana has the additional task of handling human-bear interactions.

This UM Bear Management plan has been written with the intention of addressing any past and current human-bear interactions within the university's boundaries to prevent further issues or escalations in the future. Context for this Management Plan comes from the 2021 actions within Missoula through the Bear Smart Working Group to limit the amount of habituated bears within Greater Missoula’s city limits, specifically in the “bear buffer zone” which can be referenced in *Figure 1* of the appendix. The UM Bear Management plan outlines the background of historical bear activity on campus and within Missoula while offering a set of guidelines for waste management in areas of campus deemed problematic. Our GLI Capstone group advised by Eva Roche, the Montana Student Chapter of the Wildlife Society, and local bear experts such as Jamie Jonkle and Chris Servheen have highlighted those problematic areas at different times in recent years.

Additional resources available in this document include a cost analysis for the use of facilities, and University of Montana decision makers to estimate the total cost and labor needed to achieve a safer environment for humans and bears alike. Bear Safe education suggestions for current and future students, along with faculty, staff and frequent visitors of the University of Montana campus are included. The educational strategies proposed in this plan aim to increase awareness amongst UM affiliates of bear attractants, bear behavior, and how to safely navigate bear habitat.

## **BACKGROUND**

### *A History of Black Bears on Campus*

Human-wildlife interactions are increasing due to development, particularly when it concerns black bears (*Ursus americanus*) encroaching onto urban spaces looking for food (Lewis 2015). With increased interactions between humans and bears comes potential for conflict: “These conflicts [are] caused by competition between bears and humans for food and space. In most cases, the bears [are] present in these places before humans arrived” (“*Bear Hazard Assessment*” 2022) There is an ongoing issue each summer and fall with bear activity on campus and a need for proactive management. Currently, we are seeing an increased number of bears across the Missoula Valley. These bears are becoming habituated and therefore are increasingly deemed “problem bears.” There is a direct correlation between how food conditioned a bear becomes, habituation level that a bear reaches, and the creation of a conflict bear (Marley 2016). As of October 2022, there are 150 to 200 black bears within the Missoula Valley, and upwards of 80 within Missoula County (Missoula Bear Smart Working Group 2022). In order to address

these issues, both the city of Missoula and UM must take precautionary measures to avoid creating conflict bears for the future.

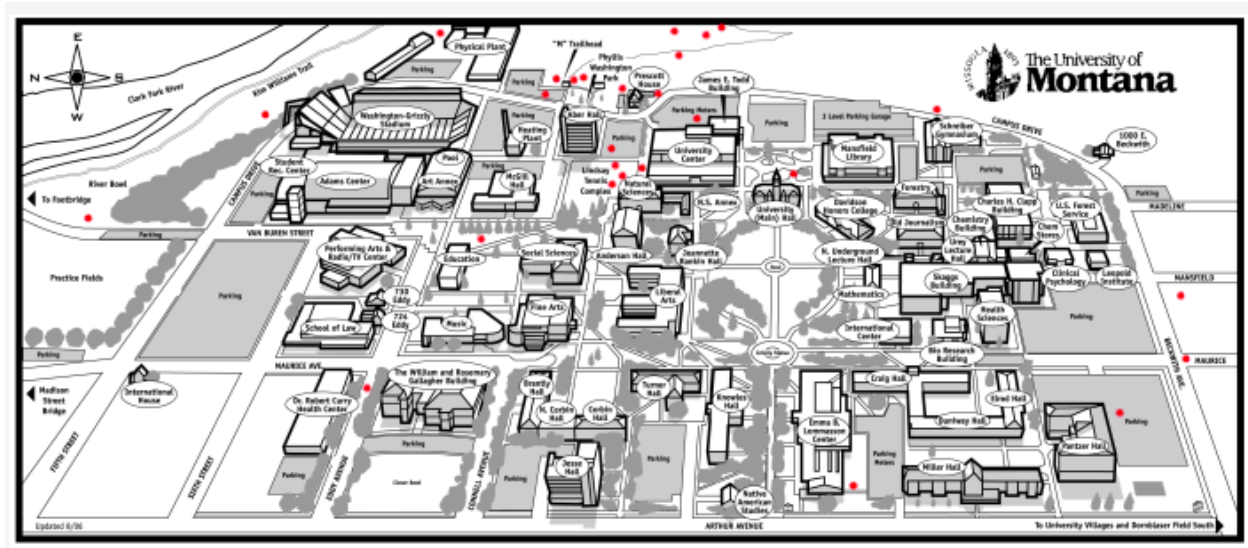


FIGURE 1. Approximate locational map of bear sightings on the University of Montana Campus from October 2020 through September 2022, as reported by UMPD through the Clery Act. Bear sightings located at red dots.

On October 4, 2022, the Missoula City Council officially voted to make Missoula a Bear Smart community, a standard coined by the Bear Smart program that comes from Victoria, British Columbia. The Bear Smart Program measures how fit a community is when it comes to managing human-bear cohabitation. Presented by Missoula's BearSmart working group to the City Council, the plan outlines a buffer zone around Missoula to install bear-safe garbage cans, as well as remove fruit trees, outdoor pet food, and other bear attractants. The University of Montana is included in the proposed bear buffer zone. That proposal also estimated that there are over 200 black bears in Missoula, which means that 200 black bears could be tempted to peruse

city streets, neighborhoods, and campus in search of food. Bear attractants on campus could put humans and bears in danger if not properly addressed.

By examining past bear management in the United States and beyond, as well as current practices in Missoula, we propose an official bear management plan for the University of Montana to make it the country's first Bear Smart campus. The university is a leader in our community; proactively establishing its own internal working group and adopting a Bear Smart Plan would signal to others in Missoula that this is an issue that must be taken seriously and that UM is willing to do our part. The University of Montana Missoula may be the first American university to develop a campus-specific bear management plan, so there is potential for UM to serve as a leader and model for campuses dealing with similar challenges. If the campus fails to implement bear safe practices, it will set a poor standard for the rest of Missoula in following the Bear Smart guidelines to protect both humans and bears from further conflict. The need to address bear-human conflict will only intensify as grizzly bears expand their distribution into the Missoula Valley. **Grizzly bears will pose additional dangers to humans not presently experienced with black bears.**

*Missoula Actions to be "Bear Safe"*

The City of Missoula, with advice from Montana Fish, Wildlife and Parks (FWP) have codified a Bear Buffer Zone (BBZ). Missoula Municipal Code Title 8 entitled "Health and Safety", Chapter 8.28.085 "Special provisions for the accumulation and storage of garbage within the Bear Buffer Zone" reads as follows:

**8.28.085 Special provisions for the accumulation and storage of garbage within the Bear Buffer Zone (Appendix Figure 1).**

A. It is unlawful to accumulate or store garbage that is attractant to bears within the Bear Buffer Zone in any manner that allows bears access. For the purpose of this chapter, garbage is also defined as any other human generated waste that attracts bears, not to include roadkill or windfall fruit. Except as provided in B. through D. below, bear attractant garbage shall be secured in a bear resistant container or enclosure.

B. Persons may, as an alternative to A. above, place non-bear resistant garbage containers containing bear attractants at the curb, alley, or public right-of-way only after 5:00 am on the morning of waste pickup. After waste pickup, the non-bear resistant garbage container that previously held bear attractants must be re-secured and stored inside an enclosed building or inside a bear resistant enclosure by 9:00 pm on the day of waste pickup.

C. Commercial, governmental, and institutional entities located within the Bear Buffer Zone may as an alternative to A. or B. above, develop a written waste management plan to prevent bears access to attractant waste. The waste management plan and any amendments will be approved in writing by Montana Fish, Wildlife, and Parks (FWP) and appropriate commercial waste hauler. City-County health department may be petitioned to arbitrate if the event plan agreement cannot be made between FWP and the entity.

D. Outdoor trash compactors may be used within the Bear Buffer Zone provided no waste is exposed and compactor doors are kept closed at all times, except when loading or removing wastes. The area around the compactor must be kept clean of garbage. (Ord. 3419, 2010).



## Missoula Bear Smart

On October 4, 2022, the Missoula City Council adopted the Missoula Bear Smart Working Group's plan to make the city safer for bears and to reduce bear attractants. The plan outlines areas around Missoula that are of concern and provides recommendations for policies to reduce bear/human interaction and motivate the community to make mindful decisions such as carrying bear spray in certain areas.

## WASTE MANAGEMENT PLAN

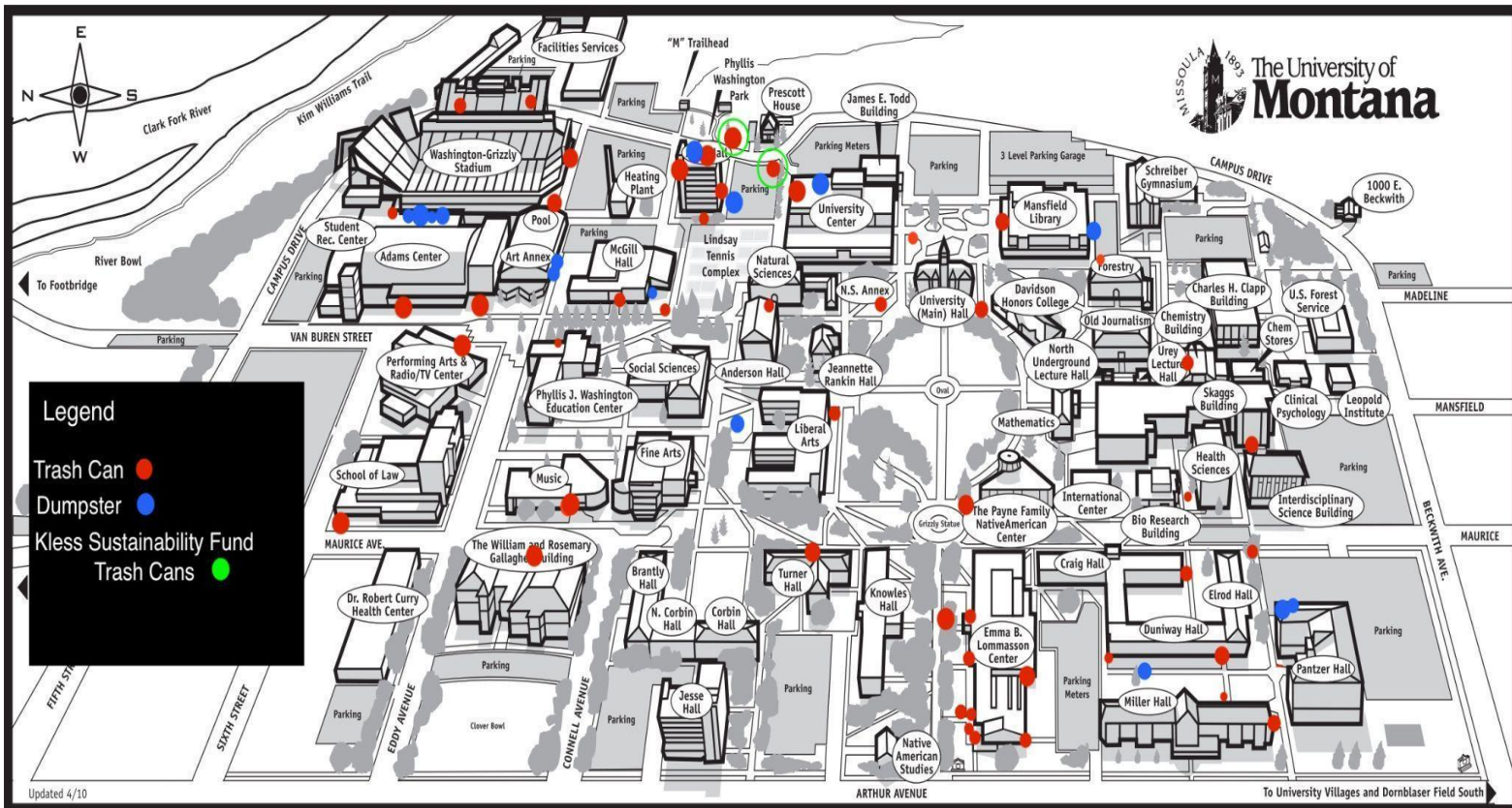


FIGURE 2. Map of trash cans and dumpsters around the University of Montana Campus.

***Location: Washington-Grizzly Stadium***

The Issue

The Washington-Grizzly Stadium is of particular concern on game days and less frequently during concerts. On game days, 26,000+ individuals fill campus for tailgate parties along the area north of the stadium along the Kim Williams Trail and south along Campus Drive.

Tailgaters are required to remove their own trash in a “pack it in, pack it out” fashion and the tailgate area is inspected post-game by employees of Facilities Services with any remaining waste foodstuffs removed after the game.

Proposed Strategy

During football season, a third roll-off dumpster is added to the facilities services compound to accommodate the additional trash from the stadium. This third dumpster contains waste food and a number of empty food containers and is considered an attractant for bears. The fence itself has thus far provided an effective barrier and has kept bears out of the compound. UM, in partnership with Republic Services, should consider installing a 30-yard roll-off for game day waste that has a lockable heavy weight metal lid for all future game day waste. The container will keep bears out, but the scent may still attract them. The issue of trash scents attracting bears can be addressed by running wires along the top of the fence of the compound and running a current through them at night. This will provide a second and generally approved barrier to preclude bear access to garbage stored pending pickup.

While the Kim Williams Trail is a bear corridor that bears use occasionally to enter and forage in more urban parts of Missoula, there have been no documented bear/garbage issues in the tailgate area and it is UM's intent to continue the existing policy of no garbage left outside of enclosures overnight. The stadium proper is fully enclosed by a chain link fence that provides a reasonable barrier to bear access. In conversation with Jamie Jonkel from FWP, he considered the current enclosure around the stadium adequate. In the event bear/garbage problems do occur within the existing perimeter fence, UM would contact FWP for a further evaluation. Either the bear would be trapped and moved per FWP standard protocol or UM would consider modifications to the existing facility, or more timely removal of the dumpster contents within the enclosure.

***Location: Kim Williams***

The current strategy as described above has worked well for management of the Kim Williams since the stadium is the main attractant that would bring bears into Missoula. This capstone group proposes informational signs being placed along the Kim Williams trail, the M-Trail, and the trail system above Lewis and Clark Apartments so that students understand that bears live along the trails. In addition, there is a narrow footpath on the south side of the M trail that connects the Kim Williams Trail and the M trail parking lot. This path is a known bear corridor and signage could be installed to keep users informed. Normally, there are two 30-yard roll-off dumpsters located in the compound adjacent to this path. One is for building waste (broken furniture, construction waste etc. and the other for recycled paper). Under normal conditions, neither of these dumpsters contain any foodstuffs that would attract bears, so this Plan does not recommend any new actions be taken.

***Location: Prescott House***

The Issue

Overflowing and unkempt trash cans are located in close proximity to the Kim Williams Trail and the base of Mount Sentinel, both areas of current and potential bear activity. Bear sightings are common around the Prescott house due to non-bear safe garbage containers in close proximity to the house.

Proposed Strategy

Recommendations for higher management of trash during events and removal of trash cans when events are not occurring. Any garbage accumulated through the Prescott house should be taken to the containers at the base of the M trail or at the University Center during non-event times.

***Facility Services - Individual Outdoor Trash Cans***

There are several standalone trash containers throughout campus in need of full replacement or in need of bear safe lid attachments (Figure 2). While cement containers are sturdy enough to contain garbage without being knocked down, we recommend bear safe lids. Regular maintenance and servicing of trash containers is crucial, as is training for use of new trash cans if needed. We also recommend that UM enclose several of the 3-yard dumpsters around campus with chain-link fence (Figure 3).

We also recommend the replacement of several standalone trash cans along Campus Drive and at the base of Mount Sentinel with bear proof containers. FWP and other Missoula organizations provide financial support for bear proof infrastructure, so once UM decides to move forward with replacing these containers, cost matching will make the purchase more affordable. This will help the public realize that they are in bear habitat and help preclude any future bear/garbage issues with these containers.

***Location: University Center***

We recommend The University Center continue to utilize the fully enclosed compacting dumpster currently in place. Consistent with existing practice and the new Missoula resolution, the area around the compactor should be kept clean of garbage at all times. For compost collection behind the University Center, increased training for proper use of compost enclosures and disposal of overflow compost is suggested.

***Location: Off Campus Housing***

UM Housing has a number of dumpsters installed at Lewis and Clark and University Villages that serve the many residents living off campus. These dumpsters are not currently enclosed or secured from bear access. There have been instances in the past where bears have accessed several of these dumpsters. Acting on advice from FWP, UM Housing made arrangements with Republic Services to have all of these dumpsters emptied more frequently. The increased pickup frequency has proven effective in reducing the bear/garbage interaction associated with these

dumpsters but does not fully comply with the requirements of the new resolution, as the resolution requires bear proof containers or fences around the trash cans. UM should, in conjunction with FWP and Republic Services, design and construct chain link bear resistant enclosures for all UM Housing dumpsters within the Bear Buffer Zone (BBZ) . The design should be approved by both FWP and Republic Services prior to construction. Enclosures for compost drop off and pick up, a popular service utilized by residents should be implemented as well. UM should apply to FWP for cost share monies to assist with replacement of existing dumpsters and construction of enclosures.

***Location: Missoula College River Campus***

Similar to the mountain campus, the five garbage cans in the Missoula College parking lot will have to be replaced with bear-safe containers or fully enclosed. There is a single dumpster on the grounds that is currently surrounded by a fence. Electrification may be necessary, and removal of unnecessary cans should be considered. Only one can in the parking would be ideal.

## Location: Fruit Trees

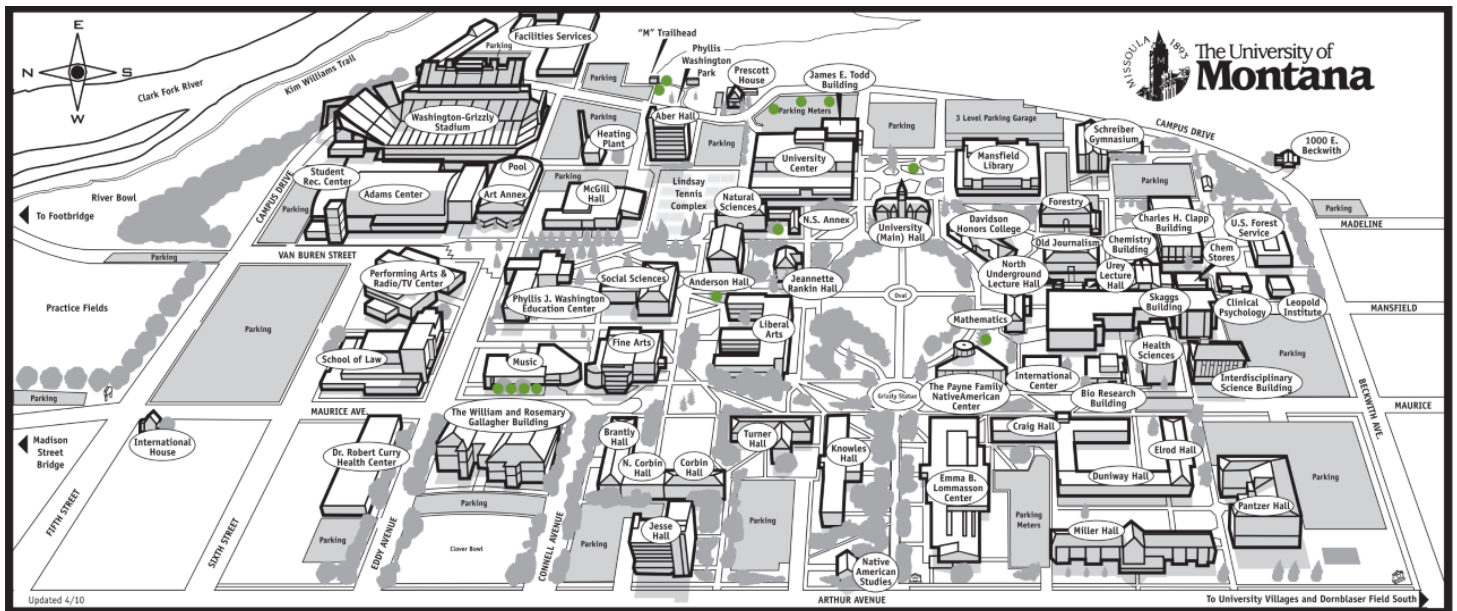


FIGURE 3. Campus fruit bearing trees and shrubs (known to this GLI group at time of creation).

The fruit from trees attracts bears. We recommend that new fruit trees planted on UM property within the BBZ will, insofar as possible, be flowering fruit trees that do not bear fruit. This reduces maintenance and eliminates the attractant for bears. In the case of a few large plants like apple trees and grapevines that the campus is reluctant to completely remove, an electric fence could be installed seasonally. The implementation of an annual event hosted by the UM Student Chapter of the Wildlife Society in the fall where University of Montana students and community members pick and clean up bear attractant fruit on campus is underway. Species of trees/shrubs that attract bears include serviceberries (*Amelanchier*), chokecherries (*Prunus virginiana*), apple trees (*Malus*), mountain ash (*Sorbus*), crabapples, huckleberry, or any other fruit-bearing shrub. An alternative to gleaning fruit is to use one of several hormone sprays (“Monterey Florel Brand Growth Regulator”) that are available. These hormone sprays can be purchased through

<https://www.montereylawngarden.com/product/floral-brand-growth-regulator/>. Professional services available locally are referenced here: <https://www.abletreeservice.com/tree-services>.

**COST:**

<b>Item :</b>	<b>Cost:</b>	<b>Suggested Quantity</b>
Individual Stand Alone Bear Proof Containers (34 gal)	\$996.00-\$1,800.00 each (Home Depot Quote)	14 Total: \$32,382 Two Requested from Kless
Bear enclosure for 3-yard dumpster (Installation/Material)	\$3,150.00 each (Estimated by Shawn Monson @ Facility Services)	11 Total: \$34,650 Two Requested from People and Carnivores
Hormone Spray Fruit Trees	\$80.00/gal (Monterey Lawn Garden)	Recurring cost every fall
Tree Removal	\$114/tree (Lawn Love)	14 Total: \$1,596.00
Trail Signs	\$880 each (ULINE quote)	3 Total: \$2,640 Requested from People and Carnivores
		<b>Total cost:</b> <b>~ \$64,072</b>

***Timeline***

<b><i>Item</i></b>	<b><i>Description</i></b>	<b><i>Approximate Date of Completion (Recommendations)</i></b>
Facilities Services Dumpsters	<i>Dumpsters requiring bear proof enclosures along Campus Drive</i>	<i>Summer 2023</i>
Campus Trash Cans	<i>Trashcans along Campus</i>	<i>Summer/fall 2023</i>



	<i>Drive and bordering Mount Sentinel as well as the Prescott House, will be covered and bear proofed or removed.</i>	
University Center (UC)	<i>Installation of bear proof trash cans around the perimeter of the UC</i>	<i>Summer 2023</i>
Fruit Trees	<i>Removing fruit from current fruit-bearing trees or installing electric fences. New trees planted will not be fruit bearing, only flowering.</i>	<i>Fall each recurring year. All fruit trees planted after spring 2023 must be non-fruit bearing.</i>
Missoula College	<i>Electrification of enclosures and addition of bear proof cans for containment on the Clark Fork River.</i>	<i>Fall 2024</i>
Kim Williams	<i>Signs on the trail detailing bear habits and bear attractants.</i>	<i>Fall 2025</i>
Off Campus Housing	<i>Includes Lewis and Clark and the University Villages. Both areas have large open dumpsters and open trash cans that need to be bear proof or covered. Small enclosure for community compost pick-up as well.</i>	<i>Fall 2025</i>

## **STUDENT AND FACULTY EDUCATION**

During the time of this capstone, nine class presentations regarding bear safety and a Take a Break Tuesday event on April 4, 2023 contributed to campus education on bear safety. Ideally starting in the fall of 2023, there will be an added part of freshman and new student orientation that details what to do if you see a bear. This would likely be in the form of an online interactive

course freshman are required to take. We suggest the use of local organization Be Bear Aware to help in continued education of campus community members who offer bear spray demonstrations and educational activities regarding how to safely live around bears.

## **FUTURE REVIEW**

In order to stay current and relevant, this plan should be reviewed and modified as necessary to accommodate new information and future bear/garbage interaction within the bear buffer zone, and with continuing changes to the Bear Smart recommendations in the city of Missoula.

## **ACKNOWLEDGMENTS**

We would like to thank the Director of the Wildlife Biology Program, Chad Bishop, for starting the original bear draft plan with former wildlife student Wyatt Nielsen in 2022. We used a lot of their wording in this document. We would also like to thank the UM Student Chapter of the Wildlife Society for their help on formulating this new plan, and for their future commitment to keeping our campus bear safe. Republic Services and Facilities Services both worked with us to come up with a workable timeline and cost-effective solutions that will keep their operations running smoothly while having bear proof additions.

We would like to extend a huge thank you to the Missoula Bear Smart working group for getting together a plan to help the entire community of Missoula. Their plan provided an extensive framework for this University of Montana plan, and we could not have completed this project without their guidance and hard work.

We would like to extend additional thanks to the Director of Facility Services for attending meetings with our student group and for working with us to implement bear safe practices on our campus.

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APPENDIX

Bear Buffer Zone Recommendation

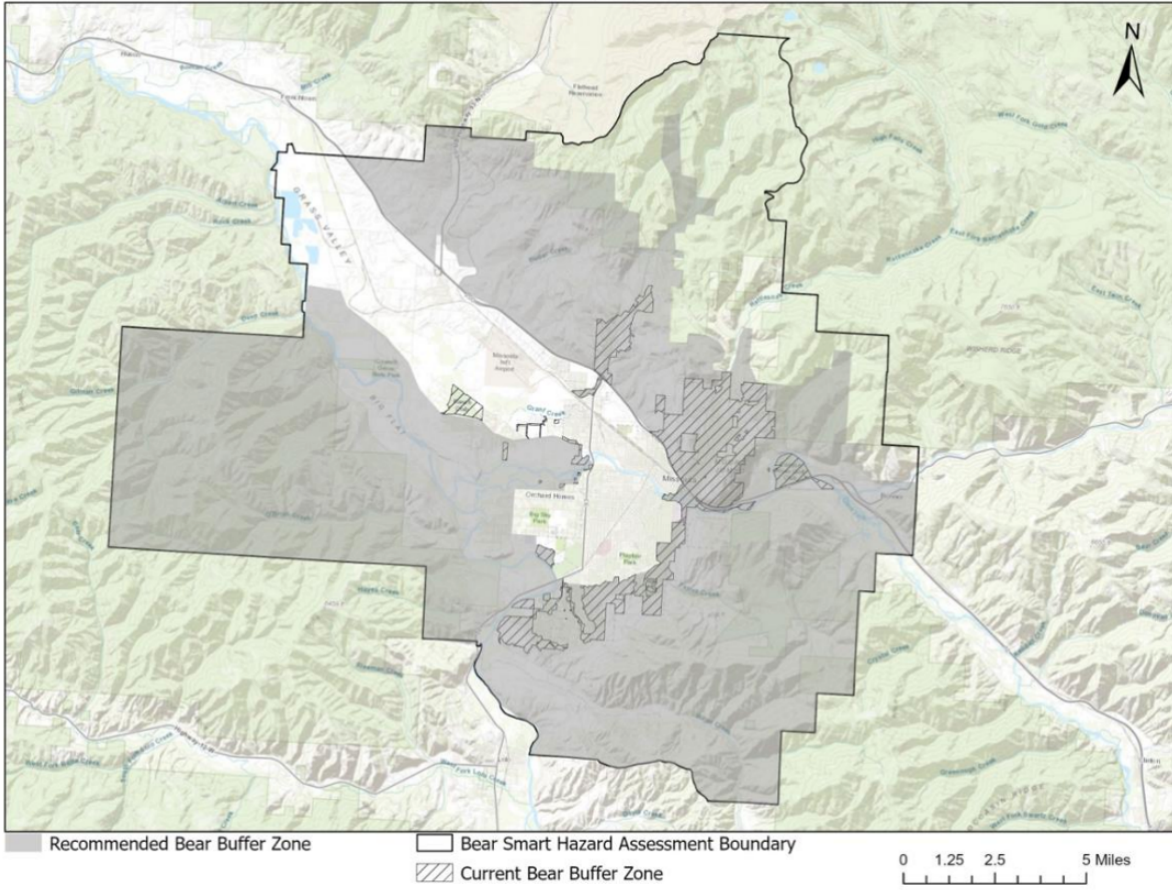


FIGURE 3. The Bear Buffer Zone (BBZ) as outlined in the Missoula Bear Smart plan passed October 4, 2022.



*FIGURE 4. A photo of bear proof cages around dumpsters in Missoula. These cages could be added around the dumpsters highlighted in this plan.*  
<https://nbcmontana.com/news/local/missoula-resident-bear-expert-raising-money-to-secure-bear-attractants>



*FIGURE 5. Taken from Missoula Bear Smart Working Group Management Plan: bear cages for smaller residential trash cans.*

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